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Trial by Media: An Empirical Investigation of Corporate Reputation and Stock Returns in Australia

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This paper examines whether investors are able to generate abnormal risk-adjusted returns in the Australian market based on media-specific firm reputational factors under market uncertainty between 2004 and 2012. Our findings suggest that after controlling for crisis-centric time periods and market risk factors, contrarian trading strategies produce abnormal returns for poor corporate reputation firms but *not* for their good corporate reputation counterparts. Corporate reputation may be a driver of performance for poorly performing Australian firms and could be considered a stimulus for trading activity due to its explanatory capabilities.

Historically, considerable effort has been devoted to understanding movements in stock market prices that are not explained by conventional financial theory (Morris & Shin, 2002). Explaining the behaviour of stock prices that cannot be accounted for by economic information has been problematic due to the inability to identify and accurately measure relevant non-quantifiable factors (Ferguson et al., 2013). For example, how do we know whether media coverage influences the market's response, or whether some unobserved facet of the story simultaneously drives both media coverage and market response? (Engelberg & Parson, 2011; Jang, 2007)

* Correspondence should be addressed to Scott Niblock, Southern Cross Business School, Southern Cross University, Southern Cross Drive, Bilinga, QLD, 4225, Australia. E-mail: scott.niblock@scu.edu.au. This paper is dedicated to the memory of Pieter van Hooff. The authors would like to thank Prof. Terry Walter, Prof. Ian Eddie, Dr Michael Kortt and the CRN program for their assistance. Data provided by SIRCA is also gratefully acknowledged.

One goal of media is to broadly disseminate relevant information via different outlets (e.g., print and digital media) to the investment community. Given mass media's broad reach (which is certainly far broader than corporate and analyst reports and other firm-specific disclosures), information revealed through the media may influence investor decision-making (Sadique et al., 2008). For instance, Fang & Peress (2009) claim that 55 million newspaper copies (not including online subscriptions) are sold to individual readers in the US, which is approximately 20% of the nation's population. Further, unobserved features that are generated through second-hand circulation of information by the media may convey a favourable or unfavourable image of the covered firm; and thus, shape corporate reputation¹ (Tong, 2013).

The literature (Barber & Odean, 2008; Eccles & Vollbracht, 2006; Frieder & Subrahmanyam, 2005; Pfarrer et al., 2010; Rindova et al., 2005; Wei et al., 2013) suggests that firms with low reputational risk and positive emotional responses in the media are more likely to enjoy greater financial performance and that corporate reputation is positively associated with investor returns. However, numerous questions remain unanswered regarding corporate reputation and financial markets. For instance, does corporate reputation (i.e., framing of firms vis-à-vis good news/bad news media coverage) affect stock price performance? Can corporate reputation be used to identify well-performing investments? And can investors generate abnormal risk-adjusted returns from this information?²

While previous studies (e.g., Barber & Odean, 2008; Pfarrer et al., 2010; Rindova et al., 2005) have examined the link between corporate reputation and return performance, it needs to be borne in mind that they rely on corporate reputation rankings that are not readily

¹ We follow Deephouse (2000, p. 1099) in defining corporate reputation as "the overall evaluation of a firm presented in the media".

² We define abnormal returns here as the intercepts from excess return regressions estimated in a multi-factor capital asset pricing model. This definition has been commonly employed in the Finance literature (see e.g., Fama & French, 1993; Carhart, 1997; Davis, 2001; Sensoy, 2009).

available for Australian listed firms. Against this background, we examine the role of the media in financial markets by examining an investment strategy specifically based on Australian corporate reputation.

In lieu of corporate reputation rankings we develop a new ‘measure of media tone’ to assess the corporate reputation of Australian firms. By doing so this allows dissecting whether market response to media is driven by an underlying unobservable construct, such as corporate reputation (Engelberg & Parson, 2011). Specifically, we consider whether a trading strategy based on the corporate reputation of S&P ASX 200 listed companies in the media can earn excess risk-adjusted returns. We also contrast the pay-off of a corporate reputation trading strategy during different degrees of market stress. Empirical evidence suggests that managed funds underperform during changing market conditions due to inertial behaviour of fund managers who remain to bear the full brunt of falling markets (Ben-David et al., 2012). Also, Wisniewski & Lambe (2013) claim that investors acting on negative sentiment in the media can improve their investment performance. Taken together, there is valid cause to compare the profitability of this trading strategy across divergent economic conditions.

The study adds to our understanding of the association of investment returns and corporate reputation by building on the work of Tetlock (2007) and Tetlock et al., (2008). The main contribution of our paper is the development of a corporate reputation measure that quantifies how companies are presented (‘framed’) in the media. This further contributes to the efficient market and investor sentiment hypotheses, as we are able to empirically examine whether affective tone influences share price performance (which differs to Tetlock (2007) and Tetlock et al., (2008) who examine market sentiment not individual firm reputation). We also examine the relationship between corporate reputation and stock returns under different economic conditions, showing that divergent market conditions can moderate the effect of corporate reputation on stock returns. To our knowledge, this is the first study that

empirically examines the effect of corporate reputation on stock returns of Australian companies across divergent economic conditions, addressing a noticeable absence in the literature.

The remainder of the paper is organized as follows. Section 2 contains a brief review of the literature and establishes the research hypotheses. Section 3 describes the data and empirical approach adopted in the study. Section 4 presents the empirical results. Section 5 discusses the implications of our findings.

LITERATURE REVIEW

Corporate Reputation Conveyed in the Media

The term ‘corporate reputation’ is based on the idea that stakeholders’ beliefs and evaluations of a company will be shaped by information received through the media (Deephouse, 2000). Indeed, the resource-based view suggests that a firm’s reputation in the media may be best understood as a strategic intangible asset based on broad public recognition of the high quality of its capabilities and outputs, leading to sustained competitive advantage and increased performance (Deephouse, 2000; King & Whetten, 2008; Rindova et al., 2005).

Although corporate information presented in the news is backward looking, the ‘tone’ and ‘spin’ of textual information accompanying the numbers can be inherently forward looking (Sadique et al., 2008). The tone employed by the writer of the news story pertains to the use of positive/optimistic, neutral or negative/pessimistic words. The spin placed on news stories relates to the editor’s positioning of information (e.g., whether to include or exclude news/information, first page or last, first paragraph or last, etc). Thus, the semantic content of media news articles may be able to indirectly provide state of mind constituencies, qualitative

descriptions of future performance and valuable insights that quantitative economic fundamentals cannot (Ferguson et al., 2013).

Corporate Reputation & Financial Markets

So how is corporate reputation perceived by market participants through the media? Research (Deephouse, 2000; Rindova et al., 2005) suggests that reputation in the media reflects collective recognition of a firm's 'demonstrated ability' to create value. Frieder & Subrahmanyam (2005) and Barber & Odean (2008) show that individuals are more likely to buy stock with strong brand recognition and that are 'attention-grabbing' in the news under the premise that they face difficulties when choosing which stock to buy from a large investment universe. Moreover, firms with low reputational risk and positive emotional responses in the media are more likely to enjoy underlying capabilities that produce consistent patterns of behaviour and performance (Barber & Odean, 2008; Eccles & Vollbracht, 2006; Frieder & Subrahmanyam, 2005; Pfarrer et al., 2010; Rindova et al., 2005; Wei et al., 2013). Pfarrer et al., (2010) argue that this collective recognition of the ability to produce value regularly can moderate uncertainty even for stakeholders who lack experience with a firm, suggesting that high reputation firms encounter lesser penalties for negative news than firms with poor reputations.

Eccles & Vollbracht (2006) also claim that while companies cannot control media agendas, they can improve the understanding and perception of their operations by the public and strengthen their overall reputation. The fact that adverse events that affect corporate reputation, such as corporate accidents, are associated with increased media attention and a negative share price reaction highlights the need to assess corporate reputation and return performance (Wei et al., 2013).

Traditional finance theory suggests that trading on second-hand information circulated by the media should be a futile investment exercise. Fama's (1998) Efficient Market Hypothesis

(EMH) in the semi-strong form posits that current prices reflect *all* publicly available information, so that media coverage should have no effect on future market activity. If one supposes that the media contains no new or useful information about past, present and future cash flows, then one would not anticipate any impact of corporate reputation on stock market performance.

However, there are empirical findings that question the information efficiency of financial markets, which lead researchers to reconsider the association between news coverage and asset prices. Empirical studies (Dyck & Zingales, 2003; Feng & Peress, 2009; Ferguson et al., 2013; Sadique et al., 2008; Tetlock, 2007; Tetlock et al., 2008) have used qualitative textual analysis (via sophisticated linguistic algorithms) and trading strategies to examine the media effect on stock market performance. The collective findings suggest that by addressing the semantics of linguistics employed in news articles, it may be possible to gauge stock market reactions to such language and measure the effects of news events on stock returns. According to Tetlock (2007) and Tetlock et al., (2008), these findings are reflected within theoretical models of investor sentiment and non-informational trading, in which non-rational traders depress stock prices in the short-run.

Given the alleged importance of a firm's representation in media outlets, we extend on this strand of research by examining the framing of companies by the media, i.e., the conveyed reputation by the media. It warrants further investigation into whether the affective language used in news stories can in fact influence return performance of listed companies. Both under the efficient market hypothesis, as well as under the investor sentiment theory, corporate reputation does not affect return performance but for different reasons: Any short-run share price changes arising from investor sentiment revert to fundamental equity values in the long-run, whereas under the efficient market hypothesis affective language will not affect stock

returns unless it bears information that it is not yet reflected in stock prices. Accordingly, we hypothesize:

H₁: Abnormal risk-adjusted returns *cannot* be generated using a firm's corporate reputation.

Another strand of research considers that media selectively focusses on certain types of information in certain economic conditions (Bhattacharya et al., 2009). This selectivity can affect stock returns. For example, Wisniewski & Lambe (2013) demonstrate that media reports can influence the future movements of stock prices during periods of economic uncertainty. They show that an increase in media pessimism during the financial crisis induces a statistically significant response in the future returns on banking stocks. Their results suggest that an active trading strategy focussing on how companies are framed in the media may in fact yield risk-adjusted trading gains in a period of increased uncertainty. Intense turbulence in the financial markets may cause increased uncertainty amongst investors, resulting in informational efficiency to deteriorate creating a permanent effect of an otherwise short-run phenomenon. We therefore extend on this notion by contrasting the performance of our trading strategy across three phases: prior, during and after the Global Financial Crisis (GFC) of 2008:³

H₂: Abnormal risk-adjusted returns *cannot* be generated using a firm's corporate reputation before crisis events.

H₃: Abnormal risk-adjusted returns *cannot* be generated using a firm's corporate reputation during crisis events.

H₄: Abnormal risk-adjusted returns *cannot* be generated using a firm's corporate reputation after crisis events.

³ Lehman Brothers (a large US investment bank) filed for Chapter 11 Bankruptcy on September 15, 2008, largely due to the US sub-prime mortgage and global credit derivative market collapse. Arguably, the sub-prime credit crisis was well underway before this event and escalated in the aftermath of Lehman Brothers' demise, creating great uncertainty and extreme market volatility during this period.

DATA & METHODS

Data & General Approach

We commence our data collection process with the S&P ASX 200 index constituents as of 31 December 2003. We chose the S&P ASX 200 index as our sample frame for three reasons: (1) Firms listed on the ASX 200 make up 78% of the market capitalisation of the entire Australian stock market; (2) Barber & Odean (2008) show that individual investors are more likely to invest in large well-known firms; and (3) ASX 200 or ‘Large-cap’ funds are prominent in Australia.

From this dataset, only companies that remain listed during the total period are considered (i.e., January 2004 to December 2012), yielding a sample of 87 companies. Nine companies of the initial sample of 87 firms experienced a significant change in business arrangement during the sample period, meaning that no news coverage was available on the Factiva database prior to the change. These firms were excluded from the sample to ensure that an analysis of the firm’s corporate reputation is reliable through time. Figure 1 shows the distribution of firms in the sample by industry sector, based on two-digit GICS codes. The figure shows that our sample distribution ranges across a number of different sectors with a relatively strong presence of Financials and Materials companies with 28.2% and 19.2% respectively. This is expected given the high concentration of stocks in these sectors relative to other sectors in the ASX 200 (Alcock & Hatherley, 2009).

We require firms to be listed for the entire time span to avoid bias due to initial public offer (IPO) underperformance or de-listing. It should also be noted that this requirement places more emphasis on larger firms within the sample. Since this selection process exposes the sample to potential full-data survivorship bias, we test for a significant return difference

of the complete ASX 200 firms (as listed on 31 December 2003) and our sample, but find none.⁴

Our next step is to collect relevant company news stories for the purpose of computing reputational measures. The news stories are obtained from the Factiva database for a period of nine consecutive years from January 2003 to December 2011. We restrict the sample to compute the media tone score to the top 100 yearly news stories ranked by relevance for each company, as we want to avoid news articles, in which the company is only mentioned in passing. This may distort the reputational score for this company. For example, if an article reports on a corporate accident by BHP and mentions Rio Tinto as its main competitor, then it would be distorting to use this news story to measure Rio Tinto's reputation. Therefore relevance ranking reflects how prominent a company features in a news article.

The search encompasses all Australian news sources ranging from online news wires (e.g., Australian Associated Press (AAP), Bloomberg, Reuters, etc) to print media (e.g., Australian Financial Review, Sydney Morning Herald, The Australian, The Age, etc) to which investors may have access. We limit the sample of news coverage to the top 100 most relevant news articles, as psychological research suggests that attention is a limited resource and visual searches are difficult (Kahnemann, 1973), and therefore a reader's attention can only focus on the most salient objects (Shipp, 2004). When the search task becomes increasingly difficult, visual search performance deteriorates (Huang & Pashler, 2005), which would imply that our restriction to 100 news stories is extremely conservative, as memorizing and

⁴ Full data survivors are defined as a set of firms that are operational throughout the entire sample period (Rohleder et al., 2011). To test for survivorship bias, we follow Bu & Lacey (2007) and test for a statistically significant return difference of our sample compared to the complete sample (dead and alive) for the entire sample period (i.e., January 2004 to December 2012). However, in contrast to Bu & Lacey (2007), we do not include any firms that entered the ASX 200 after 31 December 2003 to avoid potential look-ahead bias. Further, instead of using a parametric t-test, we perform the nonparametric Mann-Whitney U and Sign test, since the underlying time series of returns are found to be not normally distributed, as evident in significant Jarque-Bera χ^2 -statistics.

recalling a wide array of news stories over multiple firms is a very difficult task. We then compute the reputational score as outlined in the section ‘*Measurement of Media Tone*’.

The ensuing step is to collect monthly total returns for the companies. Monthly stock price data and dividend information is sourced from SIRCA and DatAnalysis. For the analysis, we use total arithmetic return defined as: $R_{i,m} = \frac{(P_t + D_t)}{P_{t-1}} - 1$.⁵ We compile 108 monthly year-ahead total return data observations from January 2004 through December 2012 for each of the 78 companies. This time horizon allows contrasting the profitability of our trading strategy during three distinct trading periods – (1) pre-crisis (January 2004 to December 2006); (2) crisis (January 2007 to December 2009); and (3) post-crisis (January 2010 to December 2012) – to examine portfolio monthly risk-adjusted return performance across diverging market conditions. According to Maheu & McCurdy (2000) bull markets show high returns combined with low volatility, while bear markets are characterised by low returns and high return volatility (which is consistent with the data periods chosen in this study).

Measurement of Media Tone

The Linguistic Inquiry and Word Count (LIWC) was used to analyse how the content of each media article may affect the individual reader (Pennebaker et al., 2006). LIWC classifies the linguistic structure of a text by totalling the number of words coupled with a series of pre-defined dictionaries. These comprise basic features such as pronoun or verb use, but also words associated with mental states such as emotions, beliefs and attitudes. Instead of using the pre-defined LIWC dictionary, we employ Loughran & McDonald’s (2011) Financial Sentiment Dictionaries. While the pre-defined LIWC dictionary detects linguistic measurements for positive versus negative emotion content expressed in the linguistic style,

⁵ Dividends used in the calculation of total returns are not inclusive of imputation credits. Total return includes ordinary and special dividends.

the Financial Sentiment Dictionaries obtain scores for positive and negative sentiment. This enables us to calculate the percentage of word matches with the word lists of the Financial Sentiment Dictionaries and determine the sentimental footprint of the company's media coverage. For each firm-year considered across the sample, we obtain the ratio of positive tone (*POSTONE*) and negative tone (*NEGTONE*) to total word count.⁶ We then combine these two ratios into one singular media tone measure (*MEDTONE*) using the coefficient of imbalance formula as employed by Tong (2013):

$$\text{Coefficient of imbalance} = \begin{cases} \frac{P^2 - PN}{T^2}, & \text{if } P > N; \\ 0, & \text{if } P = N \\ \frac{PN - N^2}{T^2} & \text{if } N > P, \end{cases} \quad (1)$$

where P is the number of positive words, N the number of negative words, and T the total number of positive and negative words. The coefficient ranges from complete negative (-1) to complete positive (1) corporate reputation coverage.

Empirical Analysis of Risk-adjusted Returns

To test our hypotheses, we sort firms based on their lagged media tone score, i.e., we construct the portfolio according to the media tone score at the beginning of each year. For example, to construct the monthly reputation portfolios in 2004, we use the media tone score as of 31 December 2003. Then we form quartiles, but are primarily interested in the top and bottom quartiles (which represent firms with the best and worst corporate reputation during any given month, respectively). After sorting firms into portfolios, we compute equally-weighted monthly portfolio returns. Following prior literature (e.g., Jegadeesh & Titman,

⁶ We confine our analyses to the Loughran & McDonald (2011) Financial Sentiment Dictionaries, as the more commonly used Harvard-IV-4 Psychological Dictionary incorrectly classifies negative words. In almost three-fourths of the cases, the Harvard dictionary identifies words as negative, which are typically not considered negative in a financial context (Loughran & McDonald, 2011). For the same reason, we do not use the LIWC dictionary. Further, untabulated results show that the LIWC dictionary returns only a very small number of matches with their word lists of positive and negative emotional content, which may be attributable to the less emotional laden writing style of business news.

1993; Armstrong et al., 2011), equal weights for firms within each portfolio are assigned to avoid placing too much emphasis on larger firms. Equally-weighted portfolios are usually calculated by purchasing a portfolio, holding it for one month, and then re-balancing the portfolio so that it has equal weights at the start of each month. However, the concern with this approach is that frequent re-balancing can produce biased estimates of realised returns because of bid-ask bounce.

To ensure that results are conservative and not subject to this bias, we compute returns to an equally-weighted ‘buy-and-hold’ portfolio that is re-balanced annually. Intuitively, using annual re-balancing suggests that corporate reputation is ‘sticky’, which implies that the public perception of a firm’s corporate reputation is *not* subject to short-term volatility. Furthermore, individual investors are usually passive investors that re-balance their portfolios less frequently than institutional investors. We refrain to use an extended time frame for portfolio construction, e.g., two to three years, as prior research has shown that retention performance of news stories (i.e., the ability of individuals to correctly recall the content of the news story) diminishes over time horizons greater than one year (Meeter et al., 2005). Next we use the Carhart (1997) four-factor model to control for market risk and to estimate risk-adjusted performance on the null hypothesis that corporate reputation has no effect on expected returns:

$$r_{P,t} = \alpha_P + \beta_{1P}RMRF_t + \beta_{2P}SMB_t + \beta_{3P}HML_t + \beta_{4P}WML_t + \varepsilon_{P,t} \quad (2)$$

$$r_{P,t} = \alpha_P + \alpha_P CRISIS + \alpha_P POSTCRISIS + \beta_{1P}RMRF_t + \beta_{2P}SMB_t + \beta_{3P}HML_t + \beta_{4P}WML_t + \varepsilon_{P,t} \quad (3)$$

where $r_{P,t}$ is the monthly return minus the 30-day treasury bill return (risk-free rate) of the respective portfolio (e.g., top or bottom corporate reputation portfolio); $RMRF$ is the excess return on the value-weighted accumulation index including all major Asia-Pacific stock

exchange stocks; and *SMB*, *HML*, and *WML* are returns on value-weighted zero-investment, factor-mimicking portfolios for size, book-to-market equity, and one-year momentum in stock returns, respectively. To perform the asset pricing tests, we use local Asian-Pacific factors. For instance, Griffin (2002) suggests that local factors outperform global factors in explaining stock returns based on a sample of UK, Japanese and Canadian returns. We tested for serial correlation (up to 6 lags) using the Breusch-Godfrey test and for non-stationarity using the augmented Dickey-Fuller test. Results show that there is no serial correlation or non-stationarity. Therefore, the model is run as originally proposed.

To test Hypothesis 1, which assumes that a firm's corporate reputation does not generate excessive returns universally, we estimate model (2) using an ordinary least squares (OLS) regression. The variable of interest is the estimated intercept a_p . If a_p is significantly greater than zero, firms with a higher/lower corporate reputation earn higher risk-adjusted returns than the market, respectively. To contrast the effectiveness of the devised trading strategy across the three sub-periods and test Hypotheses 2 to 4, we introduce two dummy variables into model (3), which are coded 1 if the observation was made during January 2007 to December 2009 (α_{CRISIS}) or January 2010 to December 2012 ($\alpha_{POST-CRISIS}$), respectively. We do not introduce an additional dummy variable for the pre-crisis period to avoid running into the dummy variable trap. In this setting, the original intercept represents the pre-crisis period ($\alpha_{PRE-CRISIS}$).

To evaluate the effectiveness of the proposed trading strategy in determining whether it significantly outperforms the ASX 200, we use cross-model comparisons.⁷ For testing whether any of the *MEDTONE* portfolios outperforms the ASX 200, we replicate the

⁷ While excess returns beyond those explained by a factor model (including the returns of a market-mimicking portfolio (*RMRF*)) already demonstrates that a particular strategy out or underperforms the market, we chose the cross-model approach for a direct comparison with ASX 200 returns, particularly given that the *RMRF* factor provided by Fama & French encompasses multi-markets across the Asia-Pacific region.

previous analysis using the ASX 200 monthly total return less the risk-free rate as the dependent variable. We then estimate the simultaneous co-variance matrix of the ASX 200 model and the respective top/bottom portfolio model using a seemingly unrelated regression. The cross-model approach allows us to compare the correlation coefficients and intercepts across the portfolio and the ASX model, where a χ^2 test statistic indicates significant differences. Of main interest here is whether the intercepts (overall and for each sub-period) significantly differ between our trading portfolios and the ASX 200. The cross-model comparison also allows us to directly test whether the returns of the bottom portfolio are significantly different from the top portfolio.

To complement the evaluation of abnormal risk-adjusted return performance of the specified portfolios, we also test whether there is a firm-specific exposure to corporate reputation using the following fixed-effects (FE) regression approach:

$$r_{i,t} - RF_t = b_0 + b_{1i}Size_t + b_{2i}BTM_t + b_{3i}Market\ Risk + b_{4i}PR6M_t + b_{5i}MEDTONE_{t-1} + b_{6i}CRISIS + b_{7i}POSTCRISIS + a_i + \varepsilon_{i,t} \quad (4)$$

$$r_{i,t} - RF_t = b_0 + b_{1i}Size_t + b_{2i}BTM_t + b_{3i}MarketRisk_t + b_{4i}PR6M_t + b_{5i}MEDTONE_{t-1} + b_{6i}CRISIS + b_{7i}POSTCRISIS + b_{8i}CRISIS * MEDTONE_{t-1} + b_{9i}POSTCRISIS * MEDTONE_t + a_i + \varepsilon_{i,t} \quad (5)$$

where the annualized return of firm i minus the risk-free rate is regressed on our measure of corporate reputation ($MEDTONE$) and other known determinants of stock returns. We chose to estimate models (4) and (5) using FE estimators, since we cannot rule out the possibility that unobserved individual differences between firms affect the results (a_i in equations 4 and 5). While it could be argued that FE estimators are preferred over random-effects (RE) estimators on the basis that unobservable variables such as management style are likely to be

highly correlated with our corporate reputation measure, we also empirically tested whether FE estimators are favored to the RE specification. We used the Hausman specification test, in which the null hypothesis (H0) is that the RE specification is the appropriate specification versus the alternative hypothesis (H1) that the FE specification is appropriate. Based on the Hausman test results for the overall effect (Panel A) and the period-specific effect (Panel B), we found that the null hypothesis is rejected. We, therefore, concluded that the FE model is the appropriate – and hence our preferred – specification. We also clustered standard errors by firm in both instances, so that estimates are robust to observations being potentially correlated within firms.

In model (4), we include firm size as measured by the market value of equity (*Size*), and book-to-market-ratio (*BTM*), constructed as the book value per share divided by the market value of equity per share at the end of the financial year. *Market risk* (i.e., beta) is estimated using weekly returns over the two years prior to the end of financial year t (Fama & French, 1993); and momentum (*PR6M*) is calculated as the stock return six months prior to the financial year-end (Carhart, 1997). We also control for any time-specific effects by including a dummy variable for each distinct time period: *CRISIS* is coded 1 if the observation pertains to the calendar year 2007, 2008, or 2009, 0 otherwise; and *POST-CRISIS* is coded 1 if the observation belongs to the calendar years 2010, 2011 or 2012, 0 otherwise.

If a firm's corporate reputation reliably predicts future firm returns, then there should be a significant positive relation of our *MEDTONE* measure with future returns. In model (5), we introduce two interaction terms of our *MEDTONE* variable with time dummy variables, *CRISIS* and *POST-CRISIS*, to investigate the corporate reputation effect conditional upon the respective time period. As with model (4), we expect a positive association of our return measure with the interaction terms, for our trading strategy to perform well in each sub-period. However, for both models it should be noted that to replicate the returns implied by

the coefficients, the investment strategy would have to take a small positive or negative position in every firm.

EMPIRICAL RESULTS

In Table 1 we provide a summary of the market-adjusted returns of the corporate reputation strategy for our sample of ASX 200 firms. Stocks are ranked based on their *MEDTONE* score and allocated into quartiles for each year, and a hedge portfolio is formed that is long in the most positive *MEDTONE* stocks and short in the most negative *MEDTONE* stocks. The average of quartile returns are adjusted for the ASX 200 ‘Total Return’ index. Panel A shows the performance of each corporate reputation portfolio and of our trading strategy across the entire observation period for one-, three-, six- and twelve- months forward. Overall, we find that our strategy generates marginal negative market adjusted returns for the one- and three-month periods (-0.59% and -1.33%, respectively). However, buying stocks with the best corporate reputation and shorting stocks with the worst significantly underperforms over a holding period of six to twelve months, with a negative return of -2.70% and -6.50% (t -stat = -4.281, $p < 0.001$).

[Insert Table 1 Here]

In Panel B, performance is broken down into each of the three distinct sub-periods of our sampling period. Panel B shows similar results to Panel A, but the spread decreases gradually from the pre-crisis to post-crisis period. While our trading strategy generates significantly negative three-, six- and twelve-month forward returns in the pre-crisis period ($t = -2.217$, $p < 0.05$; $t = -3.217$, $p < 0.01$ and $t = -3.962$, $p < 0.001$, respectively), during the crisis period only the twelve-month forward return spread between the bottom portfolio and the top portfolio is significantly different from zero ($t = 3.903$, $p < 0.001$). By contrast, none of the forward return spreads are significantly different during the post-crisis period. While this

precursory analysis shows that there might be significant differences in return performance for firms with good versus bad corporate reputation, it should be kept in mind that these differences may disappear when adjusting for factors such as risk and size. Therefore, we analyse risk-adjusted performance next.

For our trading strategy, we divide our sample into top and bottom quartiles according to *MEDTONE* scores and run the Carhart model using the Asia-Pacific factors provided on Kenneth French's website. The results are presented in Table 2. As shown in Panel A, Table 2 the top portfolio only loads significantly on market risk, which is consistent with capital asset pricing theory ($MktRF_{TOP} = 0.46$, $p < 0.001$). Compared to the returns of the ASX 200, broader market investment is preferred. The same also applies to the bottom portfolio ($MktRF_{BOTTOM} = 0.465$, $p < 0.001$).

In addition, the alpha in the bottom portfolio is significant which indicates that the bottom portfolio generates excess returns above and beyond returns that are explained by common factors such as market risk, size, value or momentum ($\alpha = 0.012$, $p < 0.05$). This finding suggests that our trading strategy that goes long in firms with good corporate reputation and short sells firms with bad corporate reputation, in fact, underperformed across the entire time period examined.

[Insert Table 2 Here]

The same analysis was then conducted with period-specific alpha factors. In Panel B of Table 2, we see that in addition to market risk, past return performance significantly explains the returns of the bottom portfolio ($WML = -0.366$, $p < 0.05$). The negative *WML* coefficient indicates that the bottom portfolio is inherently contrarian, i.e., investing into companies with low past return performance yields significant return outperformance the following year (and vice-versa).

The findings show that significant excess returns in the bottom portfolio are mainly attributable to a positive alpha throughout the pre-crisis period, suggesting that during bull markets risk appetite is heightened ($\alpha_{PRE-CRISIS_{Bottom}} = 0.025$, $p < 0.01$), while the top portfolio also significantly outperforms in the pre-crisis period ($\alpha_{PRE-CRISIS_{Top}} = 0.012$, $p < 0.01$). These findings indicate that qualitative aspects, like corporate reputation, appear to contribute to their return performance and therefore should be taken into consideration by investors. Turning our attention to the alpha factors that represent the crisis and post-crisis periods, we find that the bottom portfolio underperforms on a risk-adjusted basis, supporting the contrarian nature of the strategy ($\alpha_{CRISIS_{Bottom}} = -0.026$, $p < 0.05$). Therefore, corporate reputation may be a driver of future return performance (which is examined further in the following analyses).⁸

To put this finding into perspective, we, in fact, provide a close-up insight into the study by Fang & Peress (2009) who argue that firms with high media coverage do not generate risk-adjusted returns compared to firms with low media coverage. Using only companies with high media-visibility, we show that this conjecture is only true if media coverage is neutral. Contrasting the relationship between corporate reputation and investment performance across divergent market conditions, we find evidence that literature suggesting a positive association between their measure of corporate reputation and return performance (e.g., Pfarrer et al., 2010) may be an artefact of the period under study. Compared to companies with good reputation, poor corporate reputation seems to be inherently more risky given the more pronounced swings in return performance across market conditions.

In Table 3, Panels A, B and C, we present the results of the top and bottom corporate reputation portfolios, and with the ASX 200, respectively. Notably, the findings reflect the

⁸ The results from the pooled regression with the linear time trend show that the coefficients for the Pre-Crisis, Crisis and Post-Crisis periods differ from the similar coefficients from the seemingly unrelated regressions for the 'bottom and top portfolio groups. As such, the results may be driven by the way the time trend is modeled.

results discussed in Table 2. For example, Panel B shows that the top corporate reputation portfolio significantly differs on the *HML* and marginally on the *WML* loadings from the ASX 200 based on local factors ($HML \chi^2 = 4.24$, $p < 0.05$; $WML \chi^2 = 3.16$, $p = 0.075$). It appears that the top portfolio is more value orientated than the ASX 200, which indicates that the portfolio contains more firms with higher book-to-market ratios. Further, we find that the return of the past performance mimicking portfolio is marginally correlated with the returns of the top portfolio. However, contradictory to expectations, we find that the association is negative, which suggests that investing in the top reputation firms is also contrarian in nature.

In turn, Panel C shows that the significant χ^2 on the comparison of the *WML* factor loading suggests that an investment in the bottom portfolio is indeed a contrarian strategy ($WML = -0.366$, $p < 0.001$). The risky nature is also reflected in the comparison of the ASX 200 risk-adjusted with the bottom portfolio returns, demonstrating that even after controlling for the short-run opportunity in investing in the ASX 200 index, we can generate risk-adjusted returns beyond common risk factors that are associated with the corporate reputation of a firm.

[Insert Table 3 Here]

In lieu of Australian factor loadings, the final testing complements the previous portfolio return tests to assess whether corporate reputation has the capability to predict stock returns based on purely Australian data. Table 4 presents the results of these tests. The first regression in Panel A shows a significantly negative relation with firm size (*Size*), which corresponds with prior evidence that small firms generate greater returns compared to larger companies. Future returns correlate with *Market risk* in the expected direction, however, this relation is not significant in explaining future returns.

The association with the book-to-market ratio (*BTM*) and the momentum factor (*PR6M*) shows that it is not consistent with prior capital asset pricing studies. The significantly negative association of future annual returns with *PR6M* exhibits an underlying contrarian attitude in explaining future outperformance with past underperformance. The negative relation with value (*BTM*), while not significant, suggests that investors attach greater risk to growth stocks rather than value stocks over the examined sample period. This observation may reflect the characteristics of the underlying sample period, which due to the recent financial crisis may not align with prior evidence from non-crisis periods.

[Insert Table 4 Here]

In our sample, future one-year forward return is significantly negatively related to prior return and is negatively associated with *MEDTONE* after controlling for common determinants of stock performance and time-specific effects, supporting the main findings from Table 2. Contrary to our expectations, this result suggests that higher future returns are associated with lower corporate reputation, highlighting the contrarian nature of the trading strategy established above. In Panel B, examining the time-specific effect of *MEDTONE* by interacting the *MEDTONE* ranking with the *CRISIS* and *POST-CRISIS* variables demonstrates that this trading strategy is mainly attributable to the risk-appetite prior to the crisis, as represented in the significantly negative coefficient on *MEDTONE* (Coef. = -0.031, $p < 0.05$). This finding represents the relation of future returns with corporate reputation after controlling for the effect of *MEDTONE* during the crisis (*CRISIS*MEDTONE*) and after the crisis (*POST-CRISIS*MEDTONE*).

CONCLUSION

This paper empirically examines whether investors are able to generate abnormal risk-adjusted returns in the Australian market based on media-specific firm reputational factors

under market uncertainty. Results show that firms with poor corporate reputation outperformed the market in the combined period under investigation but are mainly driven by positive returns in the pre-GFC period. However, positive returns for poor corporate reputation firms significantly reversed in the GFC and post-GFC periods. Thus, investing in the broader market and/or short selling the risky bottom corporate reputation portfolio would have proved to be a more successful approach during these periods. The findings also indicate that after controlling for crisis-centric time periods and standard market risk factors, contrarian trading strategies produce abnormal returns for poor corporate reputation firms but *not* for their good corporate reputation counterparts.

The poor reputation portfolio may have delivered higher returns due to the inherent risks associated with companies that are negatively framed by the media and/or have weak relations with the media, investment and broader communities; thus, supporting modern portfolio theory (Fama, 1998; Fama & MacBeth, 1973; Markowitz, 1959; Sharpe, 1964). For instance, the poor reputation portfolio was riskier than the good reputation portfolio, and thus, delivered higher/lower returns under favourable/unfavourable economic conditions.

Further, the results of this study are consistent with the work of DeBondt & Thaler (1985). DeBondt & Thaler's 'overreaction' hypothesis purports that stock markets are mean-reverting over longer time horizons and that prior stock market 'losers' are better investments than prior 'winners'. This phenomenon implies that media framing conveys qualitative information that is not yet incorporated into the stock prices of poor reputation firms. As such, corporate reputation may be a driver of performance for poorly performing Australian firms and could be considered a stimulus for trading activity due to its explanatory capabilities.

Our study is the first to test return performance for a selection of firms according to a corporate reputation measure that quantifies how Australian companies are presented

(‘framed’) in the media. Specifically, we provide empirical evidence on whether a favourable corporate reputation leads to higher abnormal risk-adjusted returns in an Australian market context, and across divergent market conditions. It extends research (Tetlock, 2007; Tetlock et al., 2008) that public information conveyed through the media can be useful in predicting future financial performance. However, unlike Tetlock (2007) and Tetlock et al., (2008), who examine market sentiment, we empirically examine individual firm reputation and whether affective tone influences share price performance.

Moreover, the study adds to our understanding of the association of investment returns and corporate reputation by challenging the efficient market and investor sentiment hypotheses and other findings in the existing literature. For instance, studies suggest that corporate reputation is positively associated with investor returns (Barber & Odean, 2008; Eccles & Vollbracht, 2006; Frieder & Subrahmanyam, 2005; Pfarrer et al., 2010; Rindova et al., 2005; Wei et al., 2013). Yet, it should be borne in mind that the findings presented here may be a result of our corporate reputation measure. Future research is, therefore, encouraged to replicate our approach within different time periods and samples to provide a better understanding of the relationship between corporate reputation (as presented in the media) and return performance.

The study also contributes to modern asset pricing theory in that it examines the performance of a speculative corporate reputation-driven trading strategy before, during and after a crisis period which is not yet well understood in the literature. For example, we show that divergent market conditions can moderate the effect of corporate reputation on stock returns. Our findings are of particular relevance for investors and firms interested in whether media image of a firm is, in fact, a valuable resource, reflecting the public recognition of the firm’s underlying capabilities and providing a precursor to separate ‘winners’ from ‘losers’.

One limitation of the study is the ability of an investment strategy based on corporate reputation to consistently generate above-average returns above a naïve buy-and-hold approach, as the strategy yielded inconsistent returns across different market conditions for both top and bottom corporate reputation portfolios. As such, investors should be cautious in relying how companies are framed in the media when investing. Also, transaction costs are ignored in examining the performance of the top and bottom portfolios. Transaction costs may affect risk-adjusted returns and overall profitability of the trading strategy.

The risk-adjusted return performance of the ‘combined’ top and bottom portfolios was also not considered. The investment characteristics of the respective portfolios appear to be consistent with modern portfolio theory. For example, the poor reputation portfolio was riskier than the good reputation portfolio, and hence, provided higher/lower returns under favourable/unfavourable economic conditions. Using this rationale it is hypothesized that an equally-weighted portfolio comprising both poor and good reputation companies should achieve better risk-adjusted returns, regardless of market conditions. Therefore, an avenue for future research is the effect of transaction costs on the profitability of the trading strategy in Australia and abroad, while simultaneously combining top and bottom corporate reputation portfolios to illustrate potential diversification benefits. Such research will further develop our understanding of this interesting capital market phenomenon, improve the marketability of the trading strategy and encourage similar innovative trading strategies.

REFERENCES

- Alcock, J. & Hatherly, A. (2009). Asymmetric dependence between domestic equity indices and its effect on portfolio construction. *Australian Actuarial Journal* 15, 143-180.
- Armstrong, C. S., Core, J. E., Taylor, D. J. & Verrecchia, R. E. (2011). When Does Information Asymmetry Affect the Cost of Capital? *Journal of Accounting Research* 49, 1-40.

- Barber, B. M. & Odean, T. (2008). All That Glitters: The Effect of Attention and News on the Buying Behavior of Individual and Institutional Investors. *Review of Financial Studies* 21, 785-818.
- Ben-David, I., Franzoni, F. & Moussawi, R. (2012). Hedge Fund Stock Trading in the Financial Crisis of 2007–2009. *Review of Financial Studies* 25, 1-54.
- Bhattacharya, U., Galpin, N., Ray, R. & Yu, X. (2009). The Role of the Media in the Internet IPO Bubble. *Journal of Financial and Quantitative Analysis* 44, 657-682.
- Bu, Q. & Lacey, N. (2007). Exposing Survivorship Bias in Mutual Fund Data. *Journal of Business & Economic Studies* 13, 22-37.
- Carhart, M. (1997). On persistence in mutual fund performance. *Journal of Finance* 52, 57-86.
- Davis, J. L. (2001). Mutual Fund Performance and Manager Style. *Financial Analysts Journal* 57, 19.
- De Bondt, W. F. M. & Thaler, R. (1985). Does the Stock Market Overreact? *Journal of Finance* 40, 793-805.
- Deephouse, D. L. (2000). Media Reputation as a Strategic Resource: An Integration of Mass Communication and Resource-Based Theories. *Journal of Management* 26, 1091-1112.
- Dyck, A. & Zingales, L. (2003). The media and asset prices. *Harvard Business School Working Paper*.
- Eccles, R. G. R. E. & Vollbracht, M. M. V. (2006). Media Reputation of the Insurance Industry: An Urgent Call for Strategic Communication Management. *Geneva Papers on Risk & Insurance - Issues & Practice* 31, 395-408.
- Engelberg, J. E. & Parsons, C. A. (2011). The Causal Impact of Media in Financial Markets. *Journal of Finance* 66, 67-97.
- Fama, E. F. (1998). Market Efficiency, Long-term Returns, and Behavioural Finance. *Journal of Financial Economics* 49, 283-306.
- Fama, E. F. & French, K. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33, 3-55.
- Fama, E. F. & MacBeth, J. D. (1973). Risk, return, and equilibrium: Empirical tests. *Journal of Political Economy* 81, 607-636.
- Fang, L. & Peress, J. (2009). Media Coverage and the Cross-section of Stock Returns. *Journal of Finance* 64, 2023-2052.
- Ferguson, N. J., Philip, D., Lam, H. Y. & Guo, J. M. (2014). Media Content and Stock Returns: The Predictive Power of Press. *Midwest Finance Association 2013 Annual Meeting Paper*.

- Frieder, L. & Subrahmanyam, A. (2005). Brand Perceptions and the Market for Common Stock. *Journal of Financial & Quantitative Analysis* 40, 57-85.
- Griffin, J. M. (2002). Are the Fama and French factors global or country specific? *Review of Financial Studies* 15, 783-803.
- Huang, L. & Pashler, H. (2005). Attention capacity and task difficulty in visual search. *Cognition* 94, 101-111.
- Jang, W. Y. (2007). Media Exposure or Media Hype: Evidence from Initial Public Offering Stocks in Taiwan. *Journal of Media Economics* 20, 259-287.
- Jegadeesh, N. & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *Journal of Finance* 48, 65-91.
- Kahneman, D. & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica: Journal of the Econometric Society* 47, 263-291.
- King, B. G. & Whetten, D. A. (2008). Rethinking the Relationship between Reputation and Legitimacy: A Social Actor Conceptualization. *Corporate Reputation Review* 11, 192-207.
- Loughran, T. & McDonald, B. (2011). When is a Liability not a Liability? Textual Analysis, Dictionaries, and 10-Ks. *Journal of Finance* 66, 35-65.
- Markowitz, H. (1959). *Portfolio Selection: Efficient Diversification of Investments*. New York, John Wiley & Sons.
- Meeter, M., Murre, J. M. & Janssen, S. M. (2005). Remembering the News: Modeling Retention Data from a Study with 14,000 Participants. *Memory and Cognition* 33, 793-810.
- Morris, S. & Shin, H. S. (2002). Social Value of Public Information. *American Economic Review* 92, 1521-1534.
- Pennebaker, J. W., Booth, R. J. & Francis, M. E. (2006). *Linguistic Inquiry and Word Count (LIWC)*. Austin, Texas.
- Pfarrer, M. D., Pollock, T. G. & Rindova, V. P. (2010). A Tale of Two Assets: The Effects of Firm Reputation and Celebrity on Earnings Surprises and Investors' Reactions. *Academy of Management Journal* 53, 1131-1152.
- Rindova, V. P., Williamson, I. O., Petkova, A. P. & Sever, J. M. (2005). Being Good or Being Known: An Empirical Examination of the Dimensions, Antecedents, and Consequences of Organizational Reputation. *Academy of Management Journal* 48, 1033-1049.
- Rohleder, M., Scholz, H. & Wilkens, M. (2011). Survivorship Bias and Mutual Fund Performance: Relevance, Significance and Methodical Differences. *Review of Finance* 15, 441-474.

- Sadique, S., In, F. & Veeraraghavan, M. (2008). The Impact of Spin and Tone on Stock Returns and Volatility: Evidence from Firm-issued Earnings Announcements and the Related Press Coverage. *Working paper*, Monash University, Australia.
- Sensoy, B. A. (2009). Performance evaluation and self-designated benchmark indexes in the mutual fund industry. *Journal of Financial Economics* 92, 25-39.
- Sharpe, W. F. (1966). Mutual fund performance. *Journal of Business* 39, 119-138.
- Shipp, S. (2004). The Brain Circuitry of Attention. *TRENDS in Cognitive Sciences* 8, 223-230.
- Tetlock, P. C. (2007). Giving Content to Investor Sentiment: The Role of Media in the Stock Market. *Journal of Finance* 62, 1139-1168.
- Tetlock, P. C., Saar-Tsechansky, M. & Macskassy, S. (2008). More than Words: Quantifying Language to Measure Firms' Fundamentals. *Journal of Finance* 63, 1437-1467.
- Tong, S. C. (2013). Media Reputation in Initial Public Offerings: A study of Financial News Coverage in Hong Kong. *Public Relations Review* 39, 470-483.
- Wei, J., Wang, H., Fan, J. & Zhang, Y. (2013). Corporate accidents, media coverage, and stock market responses. *Chinese Management Studies* 7, 617-630.
- Wisniewski, T. P. & Lambe, B. (2013). The Role of Media in the Credit Crunch: The Case of the Banking Sector. *Journal of Economic Behavior & Organization* 85, 163-175.

FIGURE 1

Sector distribution of ASX 200 companies included in the sample

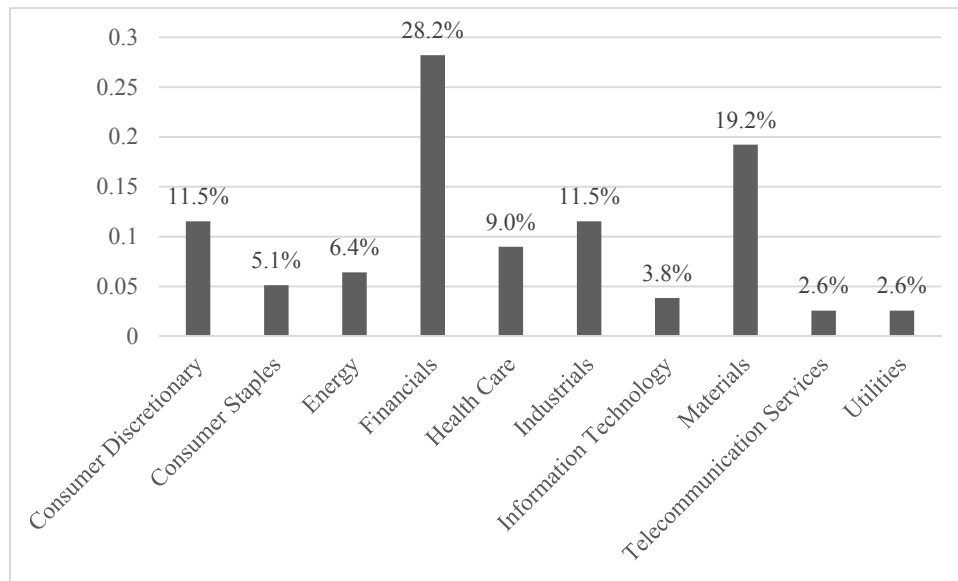


TABLE 1

Time-series Mean of Market-adjusted Returns for Each Portfolio One Year after Portfolio Formation (January 2004 to December 2012)

		One-month forward return (N=108)	Three-month forward return (N=106)	Six-month forward return (N=103)	Twelve-month forward return (N=97)
<i>MEDTONE</i> quartile					
<i>Panel A – ASX 200 stocks over entire sample period (January 2004 - December 2012)</i>					
	1 (Bottom)	0.73%	1.73%	3.40%	7.26%
	2	-0.21%	-0.70%	-1.45%	-3.16%
	3	-0.15%	-0.40%	-0.71%	-1.72%
	4 (Top)	0.15%	0.39%	0.70%	0.76%
	Spread (4-1)	-0.59%	-1.33%	-2.70%***	-6.50%***
	<i>t</i> -stat.	(-1.267)	(-1.773)	(-2.629)	(-4.281)
<i>Panel B – ASX 200 stocks over the three sub-periods</i>					
<i>PRE-CRISIS</i>	1 (Bottom)	0.84%	2.56%	5.23%	8.88%
	2	0.05%	-0.11%	-0.52%	-3.66%
	3	0.03%	0.12%	0.19%	-1.30%
	4 (Top)	0.00%	-0.14%	-0.08%	-1.41%
	Spread (4-1)	-0.85%	-2.70%*	-5.31%**	-10.29%***
	<i>t</i> -stat.	(-1.206)	(-2.217)	(-3.217)	(-3.962)
<i>CRISIS</i>	1 (Bottom)	0.43%	1.29%	3.26%	10.74%
	2	-0.22%	-0.65%	-1.42%	-1.96%
	3	-0.53%	-1.56%	-2.88%	-5.29%
	4 (Top)	0.25%	0.76%	1.21%	2.92%
	Spread (4-1)	-0.19%	-0.53%	-2.06%	-7.83%***
	<i>t</i> -stat.	(-0.255)	(0.394)	(-1.285)	(-3.903)
<i>POST-CRISIS</i>	1 (Bottom)	0.92%	1.31%	1.42%	-0.09%
	2	-0.47%	-1.38%	-2.57%	-4.18%
	3	0.04%	0.26%	0.76%	2.81%
	4 (Top)	0.19%	0.56%	1.01%	0.77%
	Spread (4-1)	-0.73%	-0.75%	-0.40%	0.87%
	<i>t</i> -stat.	(-0.754)	(-0.549)	(-0.195)	(0.275)

Note. Four portfolios are formed based on the firm *MEDTONE* ranking at the beginning of each calendar year. In order to avoid look-ahead bias, return calculation is commenced one month after the observation of *MEDTONE*. ASX 200 ‘Total Return’ index is used as the benchmark. Returns reported in the table are calculated as the rolling one-, three-, six- and twelve-month ahead returns of each portfolio as: *Market – adjusted return*_{p,T} = $\prod_t(1 + R_{p,t}) - \prod_t(1 + R_{B,t})$, where $R_{p,t}$ is the return of the portfolio in month t , $R_{B,t}$ is the return on the ASX 200, and t equals 1, 3, 6 or 12, respectively, depending on the length of the period under study. Reported *t*-statistic tests whether the forward returns of the top portfolio are significantly different from the forward returns of the bottom portfolio. *** p<0.001, ** p<0.01, * p<0.05.

TABLE 2

Risk-adjusted Return Performance of Top and Bottom *MEDTONE* Portfolios

Panel A – Risk-adjusted performance for the overall sampling period

TOP				
VARIABLES	Coefficient		SE	<i>t</i> -stat. p-val.
MktRF	0.460 ***		(0.077)	5.971 0.000
SMB	-0.144		(0.156)	-0.926 0.357
HML	-0.092		(0.139)	-0.667 0.506
WML	-0.031		(0.107)	-0.290 0.773
α	0.004		(0.004)	1.098 0.275
Observations	108			
R-squared	0.449			
Adj. R ²	0.427			

BOTTOM				
VARIABLES	Coefficient		SE	<i>t</i> -stat. p-val.
MktRF	0.465 ***		(0.082)	5.695 0.000
SMB	-0.266		(0.190)	-1.399 0.165
HML	-0.202		(0.208)	-0.971 0.334
WML	-0.298		(0.161)	-1.848 0.067
α	0.012 *		(0.006)	2.013 0.047
Observations	108			
R-squared	0.307			
Adj. R ²	0.280			

Panel B – Risk-adjusted performance for sub-periods of sampling period

TOP (pre-GFC, GFC, post-GFC)				
VARIABLES	Coefficient		SE	<i>t</i> -stat. p-val.
MktRF	0.450 ***		(0.074)	6.119 0.000
SMB	-0.140		(0.155)	-0.906 0.367
HML	-0.107		(0.140)	-0.763 0.447
WML	-0.059		(0.108)	-0.546 0.586
PRE-CRISIS α	0.012 **		(0.005)	2.647 0.009
CRISIS α	-0.013		(0.009)	-1.382 0.170
POST-CRISIS α	-0.011		(0.006)	-1.966 0.052
Observations	108			
R-squared	0.464			
Adj. R ²	0.432			

BOTTOM (pre-GFC, GFC, post-GFC)				
VARIABLES	Coefficient		SE	<i>t</i> -stat. p-val.
MktRF	0.445 ***		(0.078)	5.683 0.000
SMB	-0.257		(0.184)	-1.393 0.167
HML	-0.234		(0.205)	-1.141 0.257
WML	-0.366 *		(0.159)	-2.297 0.024
PRE-CRISIS α	0.025 **		(0.008)	3.334 0.001
CRISIS α	-0.026 *		(0.010)	-2.607 0.011
POST-CRISIS α	-0.013		(0.012)	-1.085 0.280
Observations	108			
R-squared	0.336			
Adj. R ²	0.296			

Note. This table presents the results of applying the Carhart (1997) four-factor model to estimate risk-adjusted returns (α factor) for the top and bottom *MEDTONE* quartiles. The factors used in the model are: *MktRF* = average return of market-mimicking portfolio less risk-free rate, *SMB* = average return on equal-weighted small stock portfolio minus the average return on equal-weighted large stock portfolio. *HML* = average return on equal-weighted portfolio on growth stock portfolio (high BTM) minus the average return on equal-weighted value stock portfolio (low BTM). *WML* = average return on equal-weighted portfolio of winner portfolio (high previous 12-month return) minus the average return on equal-weighted portfolio of loser portfolio (low previous 12-month return performance). *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. Robust standard errors in parentheses. Tested for serial correlation (Breusch-Godfrey with up to 6 lags) and non-stationarity (augmented Dickey-Fuller). Results show that there is no serial correlation or non-stationarity. Therefore, model is run as originally proposed.

TABLE 3**Coefficient Comparison with Top and Bottom *MEDTONE* Portfolios and ASX 200***Panel A - Top MEDTONE portfolio versus bottom MEDTONE portfolio*

Coefficients	Top	Bottom	Chi ²	p-val.
MktRF	0.450	0.445	0.00	(.953)
SMB	-0.140	-0.257	0.77	(.379)
HML	-0.107	-0.234	0.62	(.430)
WML	-0.059	-0.366	7.44	** (.006)
PRE-CRISIS α	0.012	0.025	3.73	(.053)
CRISIS α	-0.013	-0.026	1.95	(.163)
POST-CRISIS α	-0.011	-0.013	0.05	(.831)

Panel B - Top MEDTONE portfolio versus ASX 200

Coefficients	Top	ASX 200	Chi ²	p-val.
MktRF	0.450	0.507	0.93	(.334)
SMB	-0.140	-0.232	1.01	(.315)
HML	-0.107	-0.274	4.24	* (.040)
WML	-0.059	0.059	3.16	(.075)
PRE-CRISIS α	0.012	0.010	0.56	(.453)
CRISIS α	-0.013	-0.012	0.01	(.916)
POST-CRISIS α	-0.011	-0.012	0.10	(.749)

Panel C - Bottom MEDTONE portfolio versus ASX 200

Coefficients	Bottom	ASX 200	Chi ²	p-val.
MktRF	0.445	0.507	0.88	(.347)
SMB	-0.257	-0.232	0.03	(.859)
HML	-0.234	-0.274	0.07	(.796)
WML	-0.366	0.059	11.93	*** (.001)
PRE-CRISIS α	0.025	0.010	5.71	* (.017)
CRISIS α	-0.026	-0.012	3.31	(.069)
POST-CRISIS α	-0.013	-0.012	0.01	(.911)

Note. This table reports the results of the cross-model comparison of model (4) using a seemingly unrelated regression. Panel A reports the results of comparing the top portfolio performance with the bottom portfolio performance. Panels B and C present the results of comparing the top (bottom) *MEDTONE* portfolio with the ASX 200 performance. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

TABLE 4**Prediction of Future One Year Annualised Returns**

Panel A – Fixed effects regression of one-year ahead annualised return on MEDTONE and control variables (Overall effect)

VARIABLES	Coefficient		SE	<i>t</i> -stat.	p-val.
Size	-0.026	***	(0.004)	-7.235	0.000
BTM	0.010		(0.005)	1.824	0.069
Market risk	0.001		(0.003)	0.375	0.708
PR6M	-0.018	***	(0.005)	-3.461	0.001
MEDTONE	-0.028	**	(0.011)	-2.683	0.007
CRISIS	-0.016	***	(0.003)	-4.677	0.000
POST-CRISIS	-0.014	***	(0.004)	-3.813	0.000
Intercept	0.588	***	(0.080)	7.312	0.000
Observations	700				
R ²	0.258				
Number of firms	78				
adj. R ²	0.157				

Panel B – Fixed effects regression of one-year ahead annualised return on MEDTONE and control variables (Period-specific effect)

VARIABLES	Coefficient		SE	<i>t</i> -stat.	p-val.
Size	-0.026	***	(0.004)	-7.275	0.000
BTM	0.009		(0.005)	1.684	0.093
Market risk	0.001		(0.003)	0.429	0.668
PR6M	-0.018	***	(0.005)	-3.419	0.001
MEDTONE	-0.031	*	(0.015)	-2.043	0.041
CRISIS	-0.017	***	(0.004)	-4.247	0.000
POST-CRISIS	-0.008		(0.005)	-1.716	0.087
CRISIS*MEDTONE	-0.010		(0.020)	-0.482	0.630
POST-CRISIS*MEDTONE	0.031		(0.024)	1.302	0.193
Intercept	0.591	***	(0.080)	7.352	0.000
Observations	700				
R ²	0.262				
Number of firms	78				
adj. R ²	0.158				

Note. The full sample consists of 700 firm-year observations in year *t* from 2004 to 2012. One year-forward return is the annualised monthly returns for year *t*. *Size* = market capitalisation in year *t-1*. *BTM* = Book-to-market ratio at the end of year *t-1*. *Market risk* = correlation coefficient of regressing weekly returns of firm *i* for the past 2 years on the weekly market (ASX 200) returns prior to *t-1*. *PR6M* = return performance over the six months prior to *t-1*. *MEDTONE* = coefficient of media tone. *CRISIS* = 1 if observation is made in 2007, 2008, or 2009, 0 otherwise. *POST-CRISIS* = 1 if observation is made in 2010, 2011, or 2012, 0 otherwise. *** *p*<0.001, ** *p*<0.01, * *p*<0.05. Robust standard errors in parentheses.